

Sample Space Diagrams

1. Two fair dice are thrown together and the scores are added together.

a) Copy and complete the sample space diagram showing all the possible outcomes

		score on 1 st dice					
		1	2	3	4	5	6
score on 2 nd dice	1						7
	2		4				
	3						
	4					9	
	5						
	6						

b) How many outcomes are there altogether?

c) What is the most likely score?

d) What are the least likely scores?

e) Copy and complete the table showing the probabilities of throwing all the scores from 2 to 12

score	2	3	4	5	6	7	8	9	10	11	12
prob											

f) What is the probability of a score that is

i) bigger than 10 (does not include 10)

iv) a square number (1, 4, 9, 16, 25...)

ii) between 3 and 7 (not inclusive)

v) a prime number (2, 3, 5, 7, 11, 13...)

iii) even

vi) a triangle number (1, 3, 6, 10, 15, ...)

2. The sample space diagram shows the outcomes from throwing 2 dice when the scores are NOT added together.

		score on 1 st dice					
		1	2	3	4	5	6
score on 2 nd dice	1	(1,1)	(2,1)	(3,1)	(4,1)	(5,1)	(6,1)
	2	(1,2)	(2,2)	(3,2)	(4,2)	(5,2)	(6,2)
	3	(1,3)	(2,3)	(3,3)	(4,3)	(5,3)	(6,3)
	4	(1,4)	(2,4)	(3,4)	(4,4)	(5,4)	(6,4)
	5	(1,5)	(2,5)	(3,5)	(4,5)	(5,5)	(6,5)
	6	(1,6)	(2,6)	(3,6)	(4,6)	(5,6)	(6,6)

What is the probability that

a) the score is a double?

b) the score is an even double?

c) the score on one dice is twice the score on the other dice?

d) at least one of the dice shows a 2?

e) at least one of the dice shows a multiple of 3?

3. Copy and complete the diagram for the event 'the difference between the scores when two fair six sided dice are thrown' i.e. subtract the smaller score from the bigger score.

		score on 1 st dice					
		1	2	3	4	5	6
score on 2 nd dice	1	0		2			
	2	1		1			
	3	2		0			
	4			1		1	2
	5						1
	6					1	0

For the event described, find the probability that

- a) the difference is 1
- b) the difference is 0
- c) the difference is 4
- d) the difference is 6
- e) the difference is an odd number

4. Two five sided spinners are spun together.

- a) Draw a sample space diagram showing all the scores you get when the two scores are added together.
- b) How many outcomes are there?
- c) Find the probability that
 - i) the total score is 5
 - ii) the total score is an even number
 - iii) the total score is a 'double'
 - iv) the total score is less than 7

5. Two eight sided dice showing the numbers 1 to 8 were thrown at the same time.

What is the probability that the PRODUCT (multiplication) of the two dice is a square number?

6. Isaac rolls two dice and multiplies both numbers together to give their product. He wants to know the probability of rolling two dice that will give him a product between 19 and 35. Explain why a sample space diagram will help him.

7. Nic went to the garden centre to buy some roses.

She found they came in six different colours – white, red, orange, yellow, pink and copper.

She also found they came in five different sizes – dwarf, small, medium, large climbing and rambling.

a) Copy and complete the sample space diagram showing all the outcomes

		colour					
		white	red	orange	yellow	pink	copper
size	dwarf (D)	W&D					
	small (S)		R&S				
	medium (M)						
	large climbing(L)						
	rambling(R)						C&R

b) She buys a rose at random for Auntie Janet. Auntie Janet is fussy and only likes red and pink roses and she does not like climbing or rambling roses (told you she was fussy). What is the probability that Nic has bought a rose i) that she likes ii) that she does NOT like.

8. Mrs Roberts asked: "What is the probability of rolling dice and getting a total of 10 or less. You must choose from: impossible, very unlikely, even chance, likely, very likely or certain".

Evie replied "It depends on how many dice I use".

For how many dice is each of the possible choices an answer?